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Examiner Sujoy K. Kundu

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Fax: (571) 273-8300      Pages: 31, including this page  
TC 2863 - After Final

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Phone: (571) 272-8586      Date: February 27, 2006

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Re: U.S. Patent Application Serial No.  
10/817,300      Atty. Docket no.: H0819

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Appeal Brief in Response to Notice of Appeal filed December 27, 2005

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With reference to serial number 10/817,300, the following are being submitted:

- Fax Cover Sheet with Certificate of Transmission (1 page)
- Transmittal for Enclosures (2 pages)
- Appeal Brief (28 pages)

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FEB 27 2006 PATENT

Docket No.: H0819

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Jeffrey P. Erhardt et al.

Confirmation No.: 1884

Serial No.: 10/817,300

Examiner: Sujoy K. Kundu

Filed: Apr 2, 2004

Group Art Unit: 2863

For: METHOD AND APPARATUS FOR  
USING CLUSTERING METHOD TO  
ANALYZE SEMICONDUCTOR  
DEVICES

:

TRANSMITTAL FOR ENCLOSURES (check all that apply)		
<input type="checkbox"/> Response / Amendment <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/Declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement, PTO Form-1449, & cited Reference(s) <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Request for Refund	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): <ul style="list-style-type: none"> <li>• Fax Cover Sheet with Certificate of Transmission</li> </ul>
<b>Remarks</b>		

The fee, if required, has been calculated as shown below:

	NO. OF CLAIMS	HIGHEST PREVIOUSLY PAID FOR	EXTRA CLAIMS	RATE	FEE
Total Claims	20	20	0	x \$50 =	\$ 0.00
Independent Claims	4	4	0	x \$200 =	\$ 0.00
If multiple claims newly presented, add \$300					
Fee for extension of time					
Other: APPEAL BRIEF					\$500.00
					<b>TOTAL FEE</b> <b>\$500.00</b>

Please charge Deposit Account No. 01-0365 in the amount of \$500.00. An additional copy of this transmittal sheet is submitted herewith.

The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment, to Deposit Account No. 01-0365, including any filing fees under 37 CFR 1.16 for presentation of extra claims and any patent application processing fees under 37 CFR 1.17.

Respectfully submitted,

Mikio Ishimaru  
Registration No. 27,449  
Date: February 27, 2006

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**FEB 27 2006**

Docket No.: H0819

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:	Jeffrey P. Erhardt et al.	Confirmation No.:	1884
Serial No.:	10/817,300	Examiner:	Sujoy K. Kundu
Filed:	Apr 2, 2004	Group Art Unit:	2863
For:	METHOD AND APPARATUS FOR USING CLUSTERING METHOD TO ANALYZE SEMICONDUCTOR DEVICES		

TRANSMITTAL FOR ENCLOSURES <i>(check all that apply)</i>			
<input type="checkbox"/> Response / Amendment <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/Declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement, PTO Form-1449, & cited Reference(s) <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers <i>(for an Application)</i> <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Request for Refund	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to Group <i>(Appeal Notice, Brief, Reply Brief)</i> <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) <i>(please identify below):</i> <ul style="list-style-type: none"> <li>• Fax Cover Sheet with Certificate of Transmission</li> </ul>	
Remarks			

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	NO. OF CLAIMS	HIGHEST PREVIOUSLY PAID FOR	EXTRA CLAIMS	RATE	FEE
Total Claims	20	20	0	x \$50 =	\$ 0.00
Independent Claims	4	4	0	x \$200 =	\$ 0.00
If multiple claims newly presented, add \$300					
Fee for extension of time					
Other: APPEAL BRIEF					\$500.00
TOTAL FEE					<b>\$500.00</b>

Please charge Deposit Account No. 01-0365 in the amount of \$500.00. An additional copy of this transmittal sheet is submitted herewith.

The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment, to Deposit Account No. 01-0365, including any filing fees under 37 CFR 1.16 for presentation of extra claims and any patent application processing fees under 37 CFR 1.17.

Respectfully submitted,

Mikio Ishimaru  
Registration No. 27,449  
Date: February 27, 2006

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Docket No.: H0819

FEB 27 2006 PATENT**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Jeffrey P. Erhardt et al. : Confirmation No.: 1884  
Serial No.: 10/817,300 : Art Unit: 2863  
Filed: 4/2/2004 : Examiner: Sujoy K. Kundu  
For: METHOD AND  
APPARATUS FOR USING  
CLUSTERING METHOD  
TO ANALYZE  
SEMICONDUCTOR  
DEVICES

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**APPEAL BRIEF**

Sir:

The following Appeal Brief is submitted pursuant to the Notice of Appeal filed December 27, 2005 in the above-identified Application.

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Group Art Unit: 2863

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*(1) Real party in interest*

The real party in interest is Advanced Micro Devices, Inc., having its principal place of business in Sunnyvale, CA.

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**(2) Related appeals and interferences**

There are no known related appeal or interference cases.

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*(3) Status of claims*

Claims 1-20, the only claims pending, stand under final rejection, from which rejection this Appeal is taken.

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*(4) Status of amendments*

No amendments have been filed subsequent to the final rejection of October 3, 2005.

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*(5) Summary of claimed subject matter*

The following explanation of the invention by numbering (#) and insertion of reference figures, pages, and line numbers [FIG., p. and lns.] where a step is explained is intended to be exemplary and not limiting.

1. A method for analyzing a semiconductor device comprising:

testing a semiconductor device to produce first data and second data [602][p. 6, lns. 8-19];

applying a clustering method to the first data to create a clustered first data [604][p. 6, lns. 20, to p. 7, ln. 4]; and

correlating the clustered first data with the second data to determine analyzed data [606][p. 7, lns. 5-10].

2. The method of claim 1 wherein the clustering method is spatial signature analysis [604][p. 6, ln. 29, to p. 7, ln. 4].

3. The method of claim 1 wherein the clustering method is K-means clustering [604][p. 6, ln. 29, to p. 7, ln. 4].

4. The method of claim 1 wherein the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions [606][p. 6, ln. 29, to p. 7, ln. 4].

5. The method of claim 1 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation [604][p. 6, ln. 29, to p. 7, ln. 4].

6. A method for analyzing a semiconductor device comprising:

testing a semiconductor device to produce physical data and electrical data [602][p. 6, lns. 8-19];

applying a clustering method to the electrical data to create clustered electrical data [604][p. 6, ln. 20, to p. 7, ln. 4]; and

correlating the clustered electrical data with the physical data to determine analyzed data [606][p. 7, lns. 5-10].

7. The method of claim 6 wherein the clustering method is spatial signature analysis [604][p. 6, ln. 29, to p. 7, ln. 4].

8. The method of claim 6 wherein the clustering method is K-means clustering [604][p. 6, ln. 29, to p. 7, ln. 4].

9. The method of claim 6 wherein the process data is selected from a group consisting of IV curves and V<sub>t</sub> distributions [606][p. 6, ln. 29, to p. 7, ln. 4].

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10. The method of claim 6 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation [604][p. 6, ln. 29, to p. 7, ln. 4].

11. Apparatus for analyzing a semiconductor device, comprising:  
circuitry [602] for testing a semiconductor device, to produce first data and second data [p. 6, lns. 8-19];  
circuitry [604] for applying a clustering method to the first data to create a clustered first data [p. 6, ln. 20, to p. 7, ln. 4]; and  
circuitry [606] for correlating the clustered first data with the second data to determine analyzed data [p. 7, lns. 5-10].

12. The apparatus of claim 11 wherein the clustering method is spatial signature analysis [604][p. 6, ln. 29, to p. 7, ln. 4].

13. The apparatus of claim 11 wherein the clustering method is K-means clustering [604][p. 6, ln. 29, to p. 7, ln. 4].

14. The apparatus of claim 11 wherein the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions [606][p. 6, ln. 29, to p. 7, ln. 4].

15. The apparatus of claim 11 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation [604][p. 6, ln. 29, to p. 7, ln. 4].

16. Apparatus for analyzing a semiconductor device, comprising:  
circuitry [602] for testing a semiconductor device to produce physical data and electrical data [p. 6, lns. 8-19];  
circuitry [604] for applying a clustering method to the electrical data to create clustered electrical data [p. 6, ln. 20, to p. 7, ln. 4]; and  
circuitry [606] for correlating the clustered electrical data with the physical data to determine analyzed data [p. 7, lns. 5-10].

17. The apparatus of claim 16 wherein the clustering method is spatial signature analysis [604][p. 6, ln. 29, to p. 7, ln. 4].

18. The apparatus of claim 16 wherein the clustering method is K-means clustering [604][p. 6, ln. 29, to p. 7, ln. 4].

19. The apparatus of claim 16 wherein the process data is selected from a group consisting of IV curves and V<sub>t</sub> distributions [606][p. 6, lns. 8-19].

20. The apparatus of claim 16 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation [604][p. 6, ln. 29, to p. 7, ln. 4].

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**(6) *Grounds for Rejection to be reviewed on appeal***

**Issue #1:**

Claims 1-2, 6-7, 11-12, and 16-17, are rejected under 35 U.S.C. §102(b) as being anticipated by Tobin, et al. (U.S. Patent 5,982,920, hereinafter "Tobin").

**Issue #2:**

Claims 3, 8, 13, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin, et al. (U.S. Patent 5,982,920, hereinafter "Tobin") in view of Leung et al. (U.S. Patent 6,397,166, hereinafter "Leung").

**Issue #3:**

Claims 4, 9, 14, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin, et al. (U.S. Patent 5,982,920, hereinafter "Tobin") in view of Arai et al. (U.S. 2002/0145430 Al, hereinafter "Arai").

**Issue #4:**

Whether the Examiner is allowed to give the broadest possible interpretation to a claim to read on an element that is not present in the prior art.

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*(7) Arguments*

**Issue #1:**

Claims 1-2, 6-7, 11-12, and 16-17, are rejected under 35 U.S.C. §102(b) as being anticipated by Tobin, et al. (U.S. Patent 5,982,920, hereinafter "Tobin").

Tobin discloses an apparatus and method for performing automated defect spatial signature analysis on a data set representing defect coordinates and wafer processing information, including categorizing data from the data set into a plurality of high level categories, classifying the categorized data contained in each high level category into user-labeled signature events, and correlating the categorized, classified signature events to a present or incipient anomalous process condition.

Regarding claims 1, 6, 11, and 16, Applicants respectfully traverse the rejections since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Tobin of:

"applying a clustering method to the first data to create a clustered first data;"

In the Office Action of 6/14/05 (hereinafter the "Office Action"), the Examiner states:

"Regarding claim (sic) 1, 6, 11, 16 (sic) Tobin teaches...applying a clustering method to the first data to create a clustered first data (Column 2, Lines 40-48); [deletion for clarity]

Applicants respectfully disagree because Tobin does not disclose or even mention "applying a clustering method...to create a clustered first data" in Tobin Column 2, Lines 40-48, which states:

"These and other objects of the invention are met by providing a method of performing automated defect spatial signature analysis which includes the steps of producing a wafer map which includes data representing defect coordinates and wafer processing information, categorizing the data into a plurality of categories, each containing different types of signature events, and correlating a categorized signature event to a present or incipient anomalous process condition." [underlining for clarity]

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Also regarding claims 1, 6, 11, and 16, Applicants respectfully traverse the rejections since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Tobin of:

"correlating the clustered first data with the second data to determine analyzed data."

In the Office Action, the Examiner states:

"Regarding claim (sic) 1, 6, 11, 16 (sic) Tobin teaches...correlating the clustered first data with the second data to determine analyzed data (Column 2, Lines 40-48)." [deletion for clarity]

Applicants respectfully disagree because Tobin correlates an event to a condition and does not disclose or even mention that "clustered first data" is correlated in Tobin Column 2, Lines 40-48, which states:

"These and other objects of the invention are met by...correlating a categorized signature event to a present or incipient anomalous process condition." [deletion and underlining for clarity]

In the Final Rejection of 10/3/05 (hereinafter the "Final Rejection), the Examiner states:

"With regards to claims 1, 2 (sic), 11, and 16, applicant argues that Tobin et al. (5,982,920) does not disclose or even mention, "applying a clustering method...to create a clustered first data."

Examiner's position is that Tobin does disclose, "applying a clustering method...to create a clustered first data" in Column 2, Lines 40-48. Tobin mentions, "categorizing the data into a plurality of categories..."

Applicants respectfully disagreed with Examiner's position, which is not supported by the cited reference. Tobin states in Tobin col. 2, lines 40-48, *supra*, that the data is categorized by anomalous process conditions and is not subjected to any mathematical processing. It is respectfully submitted that clustering is well known to those having ordinary skill in the art to be specific types of mathematical processes, which do not read on the Tobin "categorization" and which are exemplified in Specification page 6, line 29, through page 7, line 4:

"The clustering method can be K-means clustering or Spatial Signature Analysis (SSA). K-means clustering is a nonhierarchical clustering method, which repeatedly examines data to create and refine clusters in order to maximize the significance of intergroup distance. SSA has been developed

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only to analyze group and wafer patterns. Treating the data, such as the IV curves 200 and the V<sub>t</sub> distributions 300, as a "wafer", SSA can be used to allow subsequent analysis such as wafer mapping, commonality, and correlation."

The Examiner continues in the Final Rejection:

"Applicant further argues that Tobin does not disclose correlating the clustered first data.

Examiner's position is that Tobin does disclose correlating the clustered first data. First clustered data is referred to being the categorized signature event (Column 2, Lines 40-48)." [underlining in original]

Applicants respectfully disagreed with Examiner's position, which is not supported by the cited reference. Tobin states in Tobin col. 2, lines 40-48, *supra*, that the data is categorized by an event. It is respectfully submitted that since Applicants' data is processed by a mathematical clustering process that is well known to those having ordinary skill in the art and, since Tobin's data is not, there can be no clustered data in Tobin. Thus, there cannot be any "correlating" of "the clustered first data" with the "second data" to "determine analyzed data".

In the Advisory Action of 12/12/05 (hereinafter the "Advisory Action"), the Examiner makes statements that are believed to refer to claims 1, 6, 11, and 16:

"[The Request for Reconsideration] does not place the application in condition for allowance because: Applicant argues that Tobin does not a mathematical process for categorizing. (sic) Examiner respectfully disagrees with applicant, Tobin does teach a mathematical process for categorizing as show in Column 5, Lines 43-55. Statistical analysis is considered a mathematical process." [insertion for clarity]

Applicants respectfully point out that Tobin Column 5, Lines 43-55, are not related to the claimed "applying a clustering method to the first data to create a clustered first data" nor to categorization but to Tobin post-processing as indicated in Tobin Column 5, lines 13-55:

FIG. 3 illustrates directional dilation of a set of curvilinear clusters...

After the directional dilation is applied..., several features of the new objects are calculated... These feature values then pass through a second fuzzy-constraint module...and sent back into the amorphous mask...

Once the final versions of [the amorphous mask] have been obtained, they are added together, and the complement...is taken to generate the final global mask... The final density images...are then created by multiplying the corresponding mask by the original density image... The output of the apparatus consists of three density images...

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Distribution statistics are extracted from the global event image, and object feature measurements are extracted from the curvilinear and amorphous event images. That information is then fed into the following application areas: (1) clustering analysis for statistical process control ("SPC"); (2) intelligent sampling for off-line review, and (3) signature/process clarification.

SPC charts that monitor just the total defect count tend to vary widely in the presence of multiple defect events, such as scratches..." [deletions, insertion, and underlining for clarity]

Further, it is respectfully submitted that it is obvious from the above that the Tobin mathematical processing is not even used for categorization but for statistical process control and not for statistical analysis per se.

Based on the above, it is respectfully submitted that claims 1, 6, 11, and 16 are allowable under 35 U.S.C. §102(b) as not being anticipated by Tobin because:

"Anticipation requires the disclosure in a single prior art reference disclosure of each and every element of the claim under consideration." *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983) (citing *Soundscriber Corp. v. United States*, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct. Cl.), *adopted*, 149 USPQ 640 (Ct. Cl. 1966)), *cert. denied*, 469 U.S. 851 (1984). *Carella v. Starlight Archery*, 804 F.2d 135, 138, 231 USPQ 644, 646 (Fed. Cir.), *modified on reh'g*, 1 USPQ 2d 1209 (Fed. Cir. 1986); *RCA Corp. v. Applied Digital Data Sys., Inc.*, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984).

Regarding claims 2, 7, 12, and 17, these dependent claims respectively depend from independent claims 1, 6, 11, and 16, and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations, including the limitation as exemplified in claim 2 wherein:

"the clustering method is spatial signature analysis."

In the Office Action, the Examiner states:

"Regarding claim (sic) 2, 7, 12, 17 (sic) Tobin teaches a method wherein the clustering method is spatial signature analysis (Column 2, Lines 23-25)."

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Applicants respectfully disagree because Tobin does not disclose or even mention "the clustering method" in Tobin column 2, lines 23-25, which states:

"An object of the present invention is to provide a method and apparatus for spatial signature analysis which is capable of quickly and correctly evaluating wafer map data."

In the Final Rejection, the Examiner states:

"Applicant further argues that Tobin does not teach a method wherein clustering method is spatial signature analysis as claimed in claims 2, 7, 12, 17.

Examiner's position is that Tobin does disclose the clustering method (Column 2, Lines 40-48) while evaluating wafer map data and uses spatial signature analysis (Column 2, Lines 23-25)."

Applicants respectfully disagreed with Examiner's position, which is not supported by the cited reference. As explained above, Tobin col. 2, lines 40-48, *supra*, categorizes data by conditions without the application of a clustering method. Tobin col. 2, lines 23-25, *supra*, discloses that the entire Tobin invention relates to a method and apparatus for spatial signature analysis. It is respectfully submitted that it would be obvious to those having ordinary skill in the art that this is different from a method where only one claim element uses spatial signature analysis.

In the Advisory Action of 12/12/05 (hereinafter the "Advisory Action"), the Examiner makes statements that are believed to refer to claims 1, 6, 11, and 16:

"Furthermore, Applicant argues that the entire invention relates to a method and apparatus for spatial signature (*sic*) analysis. Examiner respectfully disagrees, based upon applicants specification, page 6, lines 29-30." The clustering method CAN BE K-means clustering or Spatial Signature Analysis." [emphasis in original]

Applicants argue that the entire Tobin invention relates to spatial signature analysis because the Tobin Abstract starts, " An apparatus and method for performing automated defect spatial signature analysis..."

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The Examiner's disagreement appears to reinforce the Applicants' arguments that the entire Tobin invention relates to spatial signature analysis while only the cluster method of the present invention involves spatial signature analysis.

Based on the above, it is respectfully submitted that claims 2, 7, 12, and 17 are allowable under 35 U.S.C. §102(b) as not being anticipated by Tobin because:

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*" [emphasis added] Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co. (730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984)(citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 USPQ 193 (Fed Dir. 1983)))

Regarding claims 5, 10, 15, and 20, these dependent claims respectively depend from independent claims 1, 6, 11, and 16, and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations, including the limitation as exemplified in claim 5 wherein:

"the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation."

In the Office Action and Final Rejection, the Examiner states:

"Regarding claim (sic) 5, 10, 15, 20 (sic) Tobin teaches a method wherein the analyzed data is selected from a group consisting of wafer mapping (Page (sic) 3, Lines 50-58), commonality, or correlation."

Applicants respectfully disagree because Tobin does not disclose or even mention "analyzed data" being the result of correlating clustered data with other data from wafer mapping in Tobin column 3, lines 50-58, which states:

"FIG. 2 shows a flow chart for software used to implement the present system. A grey-scale density image  $\rho(x,y)$ , is generated from the electronic wafer map for processing. That density image can be considered a composite of several overlaying events within the wafer map data. The initial focus of wafer map signature analysis is to reduce the data set to simpler, non-overlapping (or nearly non-overlapping) sets that can be individually analyzed and finally classified to a user-defined class." [underlining for clarity]

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Based on the above, it is respectfully submitted that claims 5, 10, 15, and 20 are allowable under 35 U.S.C. §102(b) as not being anticipated by Tobin because:

"A claim is anticipated only if each and every element *as set forth in the claim* is found, either expressly or inherently described, in a single prior art reference." [italics for clarity] (*Kalman v Kimberley Clark Corp.*, 713 Fed. 2nd 760, 771, 218 USPQ 781, 789 (Fed. Circ. 1983), *Cert. Denied*, 465 U.S. 1026, 224 USPQ 520, 1984. )"

Based on all of the above, it is respectfully submitted that claims 1-2, 6-7, 11-12, and 16-17, are allowable under 35 U.S.C. §102(b) as not being anticipated by Tobin because of the holdings in *W.L. Gore & Assocs. v. Garlock, Inc.*, *supra*, *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, *supra*, and *Kalman v Kimberley Clark Corp.*, *supra*.

**Issue #2:**

Claims 3, 8, 13, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin, et al. (U.S. Patent 5,982,920, hereinafter "Tobin") in view of Leung et al. (U.S. Patent 6,397,166, hereinafter "Leung").

Tobin has been summarized above.

Leung teaches a method and system for a retail sales system for grouping multiple data points, each data point being a set (e.g., a vector, a tuple, etc.) including a measured dependent value and at least one related independent variable value, including fitting the data into a model relating the independent and dependent variables of the data, and calculating similarity and distance between the data points and groups of the data points, thereby to group the multiple data points.

Regarding claims 3, 8, 13, and 18, these dependent claims respectively depend from independent claims 1, 6, 11, and 16, and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim

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additional unobvious combinations including the limitation as exemplified in claim 3 wherein:

"the clustering method is K-means clustering."

In the Office Action and the Final Rejection, the Examiner states:

"Regarding claim (sic) 3, 8, 13, 18 (sic) Tobin discusses all the limitations as mentioned above. However, Tobin does not teach a method wherein the clustering method is K-means clustering."

Applicants respectfully disagree with the first sentence because Tobin does not disclose or even mention any of the claimed limitations as explained above. Applicants agree that Tobin does not teach or suggest K-means clustering.

In the Office Action and the Final Rejection, the Examiner states:

"It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a method wherein the clustering method is K-means clustering as taught by Leung into Tobin for the purpose of further optimizing partitions within a data set (Leung, Background of the Invention, Column 1, Lines 58-67)."

Applicants respectfully disagree because the Leung Background of the Invention states that the invention is unrelated to the Tobin automated defect spatial signature analysis of semiconductor wafers but instead is related to retail sales systems as stated in Leung column 1, lines 8-14, which states:

"The present invention generally relates to a computer-implemented method for clustering retail sales data, and more particularly to a method which assumes a model of retail demand as a function, for example, of the price, base sales rate, and seasonal factors, and clusters together items that have, for example, the same seasonal and price effect factors based on the model fit." [underlining for clarity]

Further, Leung column 1, lines 20-23, introduces the basis for the clustering taught in Leung column 1, lines 58-67, by stating that the analysis is for retail sales:

"The basic data for cluster analysis is a set of N entities for each of which p attribute values have been observed (e.g., N retail items for each of which the last 52 weeks of sales has been observed)."

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Therefore, the combination of Tobin and Leung taken as a whole would be combining a wafer analysis system with a retail sales system. It is respectfully submitted that the suggested combination would not be obvious to one having ordinary skill in the art and would be inoperative.

Based on the above, it is respectfully submitted that claims 3, 8, 13, and 18 are allowable under 35 U.S.C. §103(a) as being patentable over Tobin in view of Leung because:

"The question is whether the prior art, considering its scope and content and the level of ordinary skill, must itself suggest the combination of separate elements into the claimed invention in suit, not just whether it illustrates separate elements..." Laitram Corp. v. Cambridge Wire Cloth Co., 226 USPQ 298 at 293n (D. Md. Mag. 1985), aff'd in part, rev'd in part, and remanded, 785 F.2d 292, 228 USPQ 935 (Fed. Cir. 1986), cert. denied, 479 U.S. 820 (1986)

In the Final Rejection and the Advisory Action, the Examiner states:

"With regards to claims 3, 8, 13, 18, applicant argues that the invention is unrelated to the automated defect spatial signature analysis of semiconductor wafers but instead is related to retail sales systems.

Examiner's position is that the motivation to combine the two references of Leung as taught into Tobin teaches K-means clustering. The method of K-means clustering as taught by Leung into Tobin is used to further optimize partitions within a data set as taught by Leung (Leung, Background of Invention, Lines 58-67)."

Applicants respectfully disagree with Examiner's position. It is basic in Patent Law that even where there is a specific hint or suggestion in a particular reference but the references as a whole teach away from each other, the combination cannot be obvious according to the CAFC:

"We have noted elsewhere, as a "useful general rule," that references that teach away cannot serve to create a *prima facie* case of obviousness... If references taken in combination would produce a "seemingly inoperative device", we have held that such references teach away from the combination and thus cannot serve as predicates for a *prima facia* case of obviousness." *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)[deletion for clarity]

It is respectfully submitted that it would be obvious to those having ordinary skill in the art that a wafer analysis system would be inoperative when combined with a retail sales system.

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Based on all of the above, it is respectfully submitted that claims 3, 8, 13, and 18 are allowable under 35 U.S.C. 103(a) as being patentable over Tobin in view of Leung because of the holding in *In re Gordon, supra*.

**Issue #3:**

Claims 4, 9, 14, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin, et al. (U.S. Patent 5,982,920, hereinafter "Tobin") in view of Arai et al. (U.S. 2002/0145430 A1, hereinafter "Arai").

Tobin has been summarized above.

Arai teaches a method and an apparatus for computing a charging state of a battery without being affected by an influence of polarization. First computing means computes a voltage-current characteristic, including the influence of the polarization during a decrease of a discharge current of the battery on the basis of a terminal voltage and discharge current measured while the battery carries out a constant load discharge with a current value large enough to cancel a charge-side polarization arisen in the battery at least just before the discharge. A second computing means shifts the voltage-current characteristic to a specific extent in the direction of a voltage coordinate axis. A residual voltage drop value in advance stored by storing means is added to a present estimated voltage value estimated by estimating means on the basis of the shifted voltage-current characteristic, and thereby a present open circuit voltage of the battery is computed.

Regarding claims 4, 9, 14, and 19, these dependent claims respectively depend from independent claims 1, 6, 11, and 16, and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations, including the limitation as exemplified in claim 4 wherein:

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"the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions."

In the Office Action and Final Rejection, the Examiner states:

"Regarding, claim (*sic*) 4, 9, 14, 19 (*sic*) Tobin teaches all the limitations discussed above however, Tobin does not teach a method wherein the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions."

Applicants respectfully disagree with the first portion of the above statement because Tobin does not disclose or even mention any of the claimed limitations as explained above. Applicants agree that Tobin does not teach or suggest a method wherein the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions.

In the Office Action, the Examiner continues:

"It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a method wherein the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions as taught by Aria into Tobin for the purpose of optimally estimating electrical data."

Applicants respectfully disagree because the Examiner has not provided a citation supporting the above and has used the same rationale, which was prohibited in *In re Sang-Su Lee*, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002). In this case, the application was directed to a method of automatically displaying functions of a video display device and demonstrating how to select and adjust the function in order to facilitate response by the user. The Examiner rejection was based on obviousness based on two references. One reference was for a television menu for adjusting the picture and audio functions without a demonstration of how to adjust the functions. The other reference was for a videogame having a demonstration mode without showing adjusting the picture or audio functions. The Examiner's rationale for the combination was that it:

"would have been obvious to one of ordinary skill in the art since the demonstration mode is just a programmable feature which can be used in many different device(s) for providing automatic introduction by adding the proper programming software," and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial."

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On appeal to the Board, the Board upheld the rejection by stating:

"The conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference."

The Court of Appeals for the Federal Circuit vacated and remanded stating in particular that the Board's rejection of the need "for any specific hint or suggestion in a particular reference" to support the combination of the references was an "[o]mission of a relevant factor required by precedent [which] is both legal error and arbitrary agency action."  
[insertion and underlining for clarity]

Further, Applicants respectfully disagree because the Arai Abstract states that the invention is unrelated to the Tobin automated defect spatial signature analysis of semiconductor wafers but is related instead to the charging states of batteries as stated in Arai Abstract first sentence, which states:

"A method and an apparatus for computing a charging state of a battery without being affected by an influence of polarization are provided."  
[underlining for clarity]

Therefore, the combination of Tobin and Arai taken as a whole would be combining a wafer analysis system with a battery charging system.

Based on the above, it is respectfully submitted that claims 4, 9, 14, and 19 are allowable under 35 U.S.C. §103(a) as being patentable over Tobin in view of Arai because:

"One cannot...pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992).

The Examiner states in the Final Rejection:

"With regards to claims 4, 9, 14, and 19, applicant argues that the combination of Tobin and Arai taken as a whole would be combining a wafer analysis system with a battery charging system.

Examiner's position is that both references are directed towards data manipulation in electrical based systems. Therefore the limitations in the claims suggest that the first data computes a voltage-current characteristic as shown in both references (Arai, Abstract)."

Applicants respectfully disagreed with Examiner's position. It is basic in U.S. Patent Law that even where there is a specific hint or suggestion in a particular reference but the

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references as a whole teach away from each other, the combination cannot be obvious, *In re Gordon, supra*. Further, the Examiner cannot pick and choose among isolated pieces of prior art. *In re Fritch, supra*.

It is respectfully submitted that it would be obvious to those having ordinary skill in the art that a wafer analysis system would be inoperative when combined with a battery charging system.

Based on all of the above, it is respectfully submitted that claims 4, 9, 14, and 19 are allowable under 35 U.S.C. 103(a) as being patentable over Tobin in view of Arai because of the holding in *In re Gordon, supra*.

**Issue #4:**

Whether the Examiner is allowed to give the broadest possible interpretation to a claim to read on an element that is not present in the prior art.

In the Advisory Action, the Examiner states:

"Applicant is reminded that during patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification." Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). While the meaning of claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allowed. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)."

Applicants respectfully submit that, regardless of how broadly a claim is interpreted, when a claimed element is not present in the prior art, the claim cannot be anticipated under 35 U.S.C. 102(e).

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Applicants respectfully submit that, when a claimed element is missing from the combination and the combination taken as a whole is unobvious and inoperative, the claim cannot be obvious under 35 U.S.C. 103(a).

In *In re Gordon, supra.*, the CAFC held:

"The question is whether the prior art, considering its scope and content and the level of ordinary skill, must itself suggest the combination of separate elements into the claimed invention in suit, not just whether it illustrates separate elements...To illustrate this notion, you cannot claim that the existence of a unicorn should be obvious from taking a trip to the zoo and seeing a horse and a white rhinoceros in adjacent cages. It takes a spark of inventiveness to look at a horse and then look at a white rhinoceros and then conceive the idea of a white horse with a horn."

It is respectfully submitted that it would be unobvious to arrive at the present invention by looking at an automated defect spatial signature analysis system and then looking at a retail sales system or a battery charger.

(8). ***Claims appendix***  
See Appendix I

(9.) ***Evidence appendix***  
See Appendix II

(10.) ***Related Proceedings appendix***  
See Appendix III

***Conclusion and Relief Requested:***

Claims 1-20 are patentable over the prior art.

Reversal of the Examiner's decision is respectfully requested.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 01-0365 and please credit any excess fees to such deposit account.

Respectfully submitted,



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Date: February 27, 2006

Note: APPENDICES begin on following separate pages

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**(8) Claims appendix**

**Appendix I – Claims on Appeal**

1. A method for analyzing a semiconductor device comprising:  
testing a semiconductor device to produce first data and second data;  
applying a clustering method to the first data to create a clustered first data; and  
correlating the clustered first data with the second data to determine analyzed data.
2. The method of claim 1 wherein the clustering method is spatial signature analysis.
3. The method of claim 1 wherein the clustering method is K-means clustering.
4. The method of claim 1 wherein the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions.
5. The method of claim 1 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation.
6. A method for analyzing a semiconductor device comprising:  
testing a semiconductor device to produce physical data and electrical data;  
applying a clustering method to the electrical data to create clustered electrical data;  
and  
correlating the clustered electrical data with the physical data to determine analyzed data.
7. The method of claim 6 wherein the clustering method is spatial signature analysis.
8. The method of claim 6 wherein the clustering method is K-means clustering.
9. The method of claim 6 wherein the process data is selected from a group consisting of IV curves and V<sub>t</sub> distributions.
10. The method of claim 6 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation.
11. Apparatus for analyzing a semiconductor device, comprising:  
circuitry for testing a semiconductor device, to produce first data and second data;  
circuitry for applying a clustering method to the first data to create a clustered first data; and  
circuitry for correlating the clustered first data with the second data to determine analyzed data.

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12. The apparatus of claim 11 wherein the clustering method is spatial signature analysis.
13. The apparatus of claim 11 wherein the clustering method is K-means clustering.
14. The apparatus of claim 11 wherein the first data is selected from a group consisting of IV curves and V<sub>t</sub> distributions.
15. The apparatus of claim 11 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation.
16. Apparatus for analyzing a semiconductor device, comprising:  
circuitry for testing a semiconductor device to produce physical data and electrical data;  
circuitry for applying a clustering method to the electrical data to create clustered electrical data; and  
circuitry for correlating the clustered electrical data with the physical data to determine analyzed data.
17. The apparatus of claim 16 wherein the clustering method is spatial signature analysis.
18. The apparatus of claim 16 wherein the clustering method is K-means clustering.
19. The apparatus of claim 16 wherein the process data is selected from a group consisting of IV curves and V<sub>t</sub> distributions.
20. The apparatus of claim 16 wherein the analyzed data is selected from a group consisting of wafer mapping, commonality, or correlation.

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**(9) Evidence appendix**

**Appendix II – Evidence under 37 CFR 1.130, 1.131, or  
1.132 entered by examiner and relied upon by appellant**

**NONE.**

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**(10) *Related Proceedings appendix***

**Appendix III – Decisions rendered by a court or the Board  
identified in Related Appeals and Interferences section**

NONE.